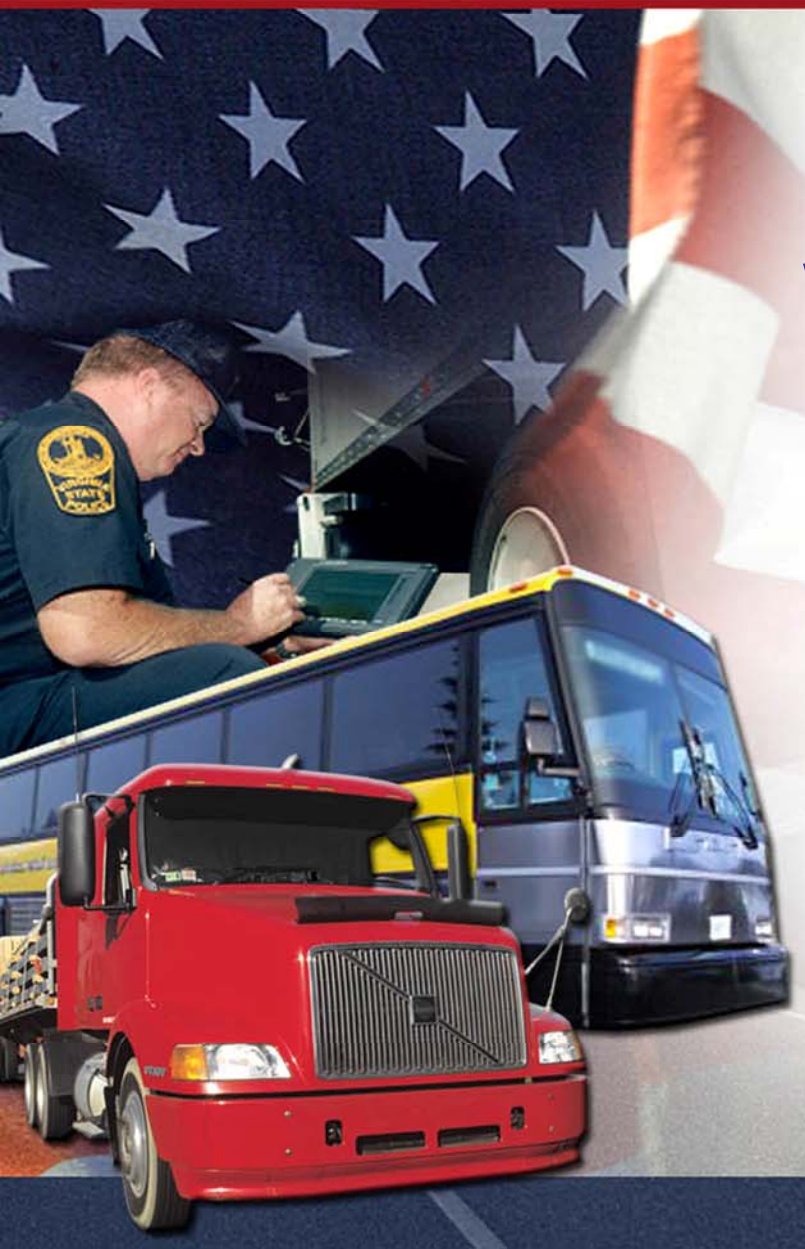
Federal Motor Carrier Safety Administration
Office of Analysis, Research and Technology



Why Trucks and Buses Collide with Cars

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Analysis Division

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Causation Studies Definitions

- Cause: Factors that *increase the risk of a crash* such as driving behavior, vehicle problems, road and weather conditions
- Trucks: Large trucks with a Gross Vehicle Weight Rating of more than 10,000 pounds
- Buses: Vehicles with seats for more than nine people, including the driver
- Cars: *Passenger vehicles* – passenger cars, pickup trucks, vans, SUVs, motorcycles

Coded Crash Variables

1. Critical Event: Makes crash unavoidable
2. Critical Reason for Critical Event: Immediate reason for critical event
3. Crash Associated Factors: All factors that might be important that were present at the time of the crash

Critical Reason in 2 Vehicle Cashes: 1 Truck and 1 Car; 1 Bus and 1 Car

- CR in Truck Study:
  - 44% Large Truck
  - 56% Car (passenger vehicle)
- CR in Bus Study:
  - 19 Bus
  - 16 Car (passenger vehicle)

Source: Large Truck Crash Causation Study, 2001 – 2003

Bus Crash Causation Study, 2005 – 2006

Critical Reason – Bus Crashes

Reasons	Bus	Cars
Non-Performance (sleep, sick)	1	4
Recognition (inattention)	10	3
Decision (speed, aggressive)	4	8
Performance (overcompensate)	0	1
Vehicle	0	0
Environment (roadway, weather)	1	0
TOTAL	16	16

Critical Reason – Truck Crashes

Reasons	Trucks	Cars
Non-Performance (sleep, sick)	3%	16%
Recognition (inattention)	35%	30%
Decision (speed, aggressive)	42%	24%
Performance (overcompensate)	7%	19%
Vehicle (brakes, tires, lights)	8%	4%
Environment (roadway, weather)	4%	3%
Unknown	1%	4%
TOTAL	100%	100%

Relative Risk

- Relationship between an Associated Factor and Critical Reason (CR)
- Example: Truck Drivers Fatigued – 7.3%
  - Coded with CR – 74.6%
  - Not coded with CR – 25.4%
  - Relative Risk – 2.9
- Example: Car Drivers Fatigued – 14.8%
  - Coded with CR – 91.7%
  - Not coded with CR – 8.3%
  - Relative Risk – 11.0

Truck and Cars Associated Factors and Relative Risk (RR)

	Trucks		Cars	
Factors	**%**	**RR**	**%**	**RR**
Brake problems	27	2	2	NA
Traffic flow interruption	24	2	25	NA
Stop required	21	4	25	NA
Unfamiliar with roadway	19	3	10	3
Inadequate surveillance	16	14	14	5
Too fast for conditions	15	7	11	5
Made illegal maneuver	12	19	13	19

Truck and Cars Associated Factors and Relative Risk (RR)

	Trucks		Cars	
Factors	**%**	**RR**	**%**	**RR**
Inattention	9	9	9	10
External distraction	8	8	6	NA
Fatigue	7	3	15	11
Tire problems	6	2	3	NA
False assumption	6	3	3	NA
Following too close	5	160	1	NA
Aggressive driving	5	4	9	4

Truck and Cars Associated Factors and Relative Risk (RR)

	Trucks		Cars	
Factors	**%**	**RR**	**%**	**RR**
Jackknife	4	4	NA	NA
Internal distraction	2	7	5	16
Illness	1	13	8	16
Cargo shift	0.6	7	NA	NA
Illegal drugs	0.4	NA	7	11

Top 8 "Causative" Factors
Trucks

1. Following too close – 834
2. Making illegal maneuver – 227
3. Inadequate surveillance – 220
4. Traveling too fast for conditions – 101
5. Inattention – 78
6. Stop required – 74
7. External distraction – 62
8. Brake problems – 54

Top 8 "Causative" Factors **Cars**

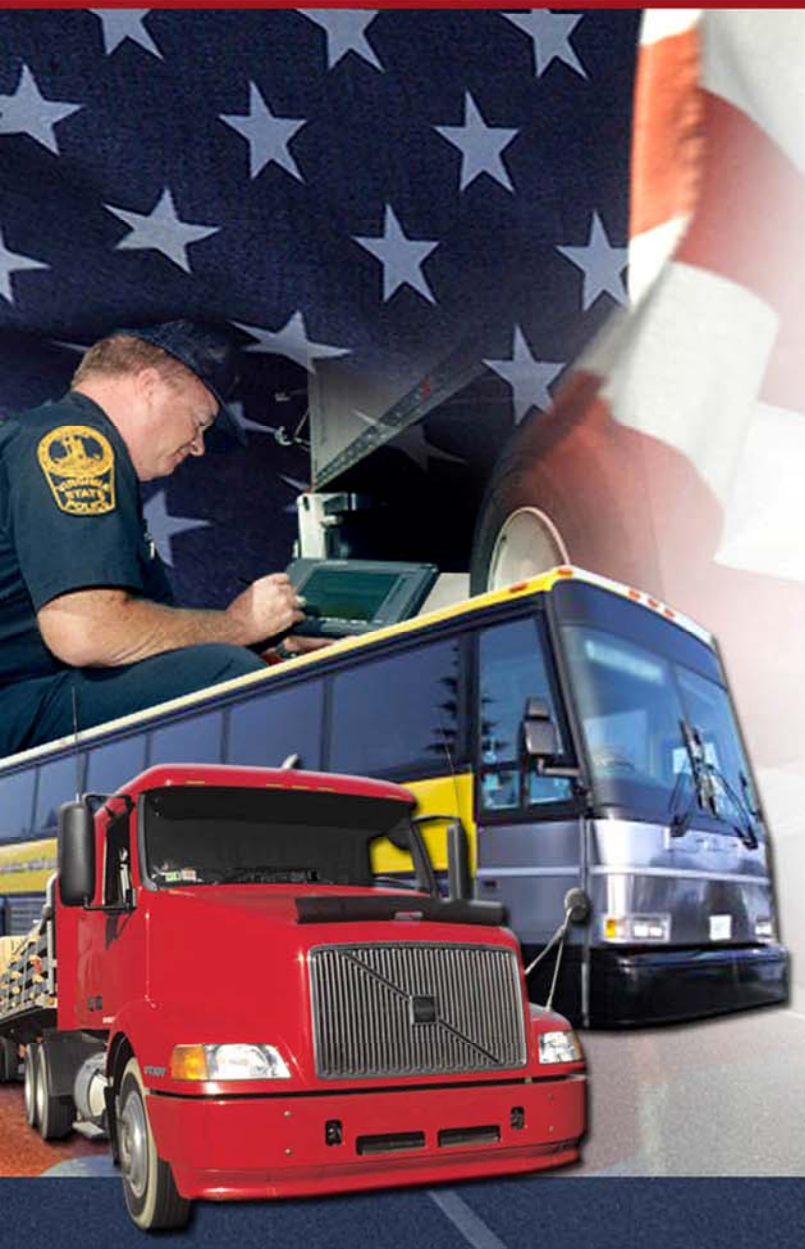
1. Making illegal maneuver – 244
2. Fatigue – 163
3. Illness – 123
4. Inattention – 92
5. Internal distraction – 74
6. Inadequate surveillance – 73
7. Illegal drugs – 72
8. Too fast for conditions – 48

Summary

- Plenty of blame for large trucks, buses, and passenger vehicles
- Cause lies mainly with drivers
- Truck drivers are in better condition to drive than passenger vehicle drivers
- Recognition and decision errors are the most common problems for truck drivers
- Vehicle issues secondary

Strategies to Explore

- Focus more on drivers during roadside inspections, compliance reviews, and outreach
- Ensure commercial drivers license system is efficient and effective
- Develop driver rating system
- Promote more human factors research
- Narrow vehicle inspections to key systems



Questions?

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